

WHAT IS CLAIMED IS:

1. A gas concentration detector provided in a space for measuring a concentration of given gas contained in measurement gasses existing within the space, the gas concentration detector comprising:

a sensor element including,

a sensor cell for detecting the concentration of the given gas contained in the measurement gasses that are admitted into a chamber within the sensor element, and

a monitor cell for detecting an O<sub>2</sub> concentration within the chamber; and

an element cover that is a cylinder having a bottom, to surround the sensor element, wherein the element cover has a gas inlet hole through which the measurement gasses flow,

wherein the gas inlet hole includes a plurality of side wall holes and at least one bottom wall hole,

wherein diameters of the side wall holes and the bottom wall hole are within a range between 0.5 and 1.5 mm, and

wherein a ratio of the diameter of the side wall holes to the diameter of the bottom wall hole is within a range between 0.5 and 1.5.

2. The gas concentration detector of Claim 1,

wherein the given gas includes NO<sub>x</sub>, and

wherein the sensor cell includes an electrode that faces the chamber and that is active in decomposing the NO<sub>x</sub> while the monitor cell includes an electrode that faces the chamber and

that is inactive in decomposing the NOx.

3. The gas concentration detector of Claim 1,  
wherein the plurality of the side wall holes includes  
four, five, or six side wall holes.

4. The gas concentration detector of Claim 3,  
wherein all of the plurality of the side wall holes are  
disposed approximately in a same virtual plane perpendicular to  
an axis of the cylinder.

5. The gas concentration detector of Claim 1, further  
comprising:

an outer cover surrounding the element cover to form a  
double structured cover by being combined with the element  
cover.

6. The gas concentration detector of Claim 5,  
wherein the outer side wall holes of the outer cover are  
disposed closer to the bottom of the element cover and the outer  
bottom of the outer cover than the side wall holes of the  
element cover.

7. The gas concentration detector of Claim 5,  
wherein the outer cover has an outer gas inlet hole  
including at least one outer bottom wall hole, and

wherein a diameter of the outer bottom wall hole of the  
outer cover is not less than the diameter of the bottom wall

hole of the element cover.

8. The gas concentration detector of Claim 5,  
wherein the outer cover has an outer gas inlet hole  
including a plurality of outer side wall holes, and  
wherein diameters of the outer side wall holes of the  
outer cover are not less than the diameters of the side wall  
holes of the element cover.

9. The gas concentration detector of Claim 5,  
wherein the outer cover has an outer gas inlet hole  
including a plurality of outer side wall holes and at least one  
outer bottom wall hole, and  
wherein diameters of the outer side wall holes and the  
outer bottom wall hole of the outer cover are not less than any  
diameters of the side wall holes and the bottom wall hole of the  
element cover.

10. The gas concentration detector of Claim 1,  
wherein the sensor element further includes:  
a pump cell for adjusting the O<sub>2</sub> concentration  
within the chamber by executing at least one of discharging O<sub>2</sub> to  
an outside and pumping O<sub>2</sub> from the outside.

11. The gas concentration detector of Claim 1,  
wherein the concentration of the given gas is detected  
from an output difference between the sensor cell and the

monitor cell.

12. The gas concentration detector of Claim 1,  
wherein the sensor cell and the monitor cell are  
disposed close to each other within the chamber.

13. The gas concentration detector of Claim 1,  
wherein the sensor cell includes an electrode formed of  
Pt-Rh facing the chamber while the monitor cell includes an  
electrode formed of Pt-Au facing the chamber.